



WEATHERING THE STORM: HARNESSING DISRUPTION IN AVIATION

Introduction

The aviation industry did not exist when Elizabeth Barrett Browning wrote Sonnet 43 that contains the lines “How do I love thee? Let me count the ways”. However, leaders of airlines continue to work hard to get existing and new customers to love their carriers enough to fly with them. Travelers choose airlines for many reasons including connectivity, convenient schedules, fares, baggage policies, booking experience, reliability, on-time performance, safety track record, loyalty programs, brand reputation, aircraft comfort, and in-flight service. Criteria such as sustainability - the airline’s carbon footprint and their decarbonization measures are also becoming important. (We will consider inserting a link to the article on SAFc here). Some of the above factors are more directly controllable by the airline’s strategic and tactical choices than others.

For each trip, travelers decide based on their specific needs, priorities and preferences. In general, most passengers highly value getting to their destinations safely on schedule, which is why flight disruptions are becoming a bigger deal for airlines around the world. Disruptions to flight operations have always been a source of pain for airlines, but it is the emergence of new sources of disruption that pose additional threats, increasing the risk of flight delays/cancellations and hence, customer dissatisfaction. High influence of social media causes traveler decision on choosing (or not to) a particular airline based on last disruption recovery measures and passenger assistance. This PoV looks at the common types of disruption airlines face and suggests steps that can potentially reduce the risk of adverse impact.

Flight disruptions continue to pose a major challenge to the industry

Disruptions affect passengers and airlines in different ways and to varying degrees. The former face personal or professional consequences whose severity depends on the purpose of travel. It is thus not surprising that a study by J.D. Power found that most travellers (42%) identified disruption management as the single most important area of improvement for airlines.

For airlines, disruptions adversely impact profitability, brand reputation and business growth. Delays in aircraft and crew reaching their scheduled destinations cause a cascading effect. Landing slots may not be available. Overnight parking charges may need to be incurred. Subsequent flights are delayed. Significant delays lead to cancellations, causing revenue loss

and lower capacity utilization, in turn reducing profitability of individual flights. Flight disruptions are estimated to cost airlines between US\$25B-US\$35B annually (around 5% of revenue). The figure increases to US\$60 billion (8% of revenue) if costs associated with travellers, businesses and others in the ecosystem are factored. In the context of the highly price-competitive airline industry, even reducing this loss by half can significantly boost profitability, cashflows, and shareholder returns. It can allow airlines to invest more for shaping and protecting their future.

(source of data quoted above: <https://digitaltravelapac.wbresearch.com/blog/4-travel-disruptions-affecting-otas-airlines>)



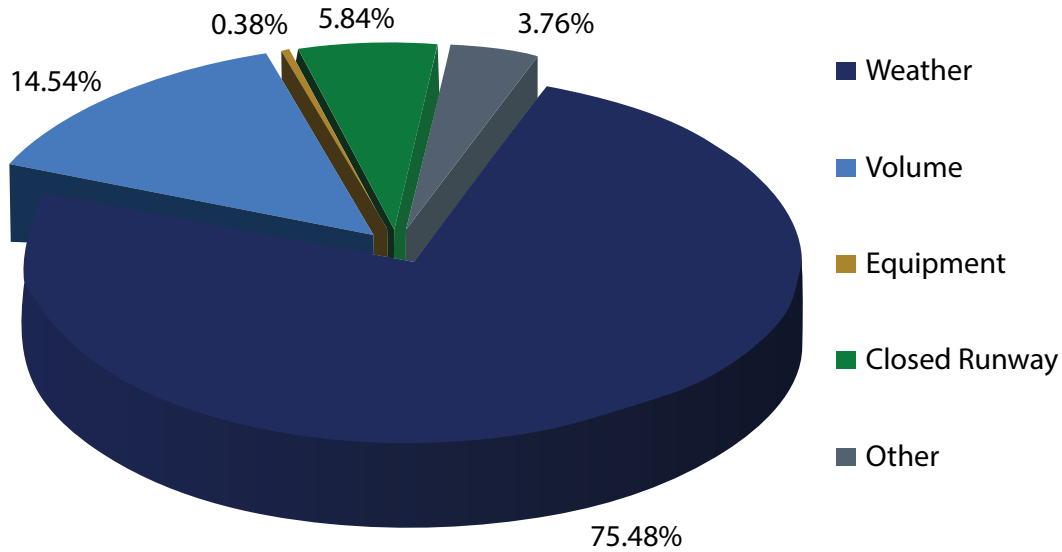
While known causes of flight disruptions continue, the emergence of new ones is worrying

Strikes by unions of **airline crew or ground staff** have long been a common reason for airline operations to be impacted. Flash strikes are not easy to predict and address, but when unions have given advance warning of their intentions to strike work, airlines have been able to implement contingency plans. As more self-service and automation reduces the need for human employees in certain areas (e.g., check-in counters and baggage handling), airlines will need to manage transitions with greater sensitivity.

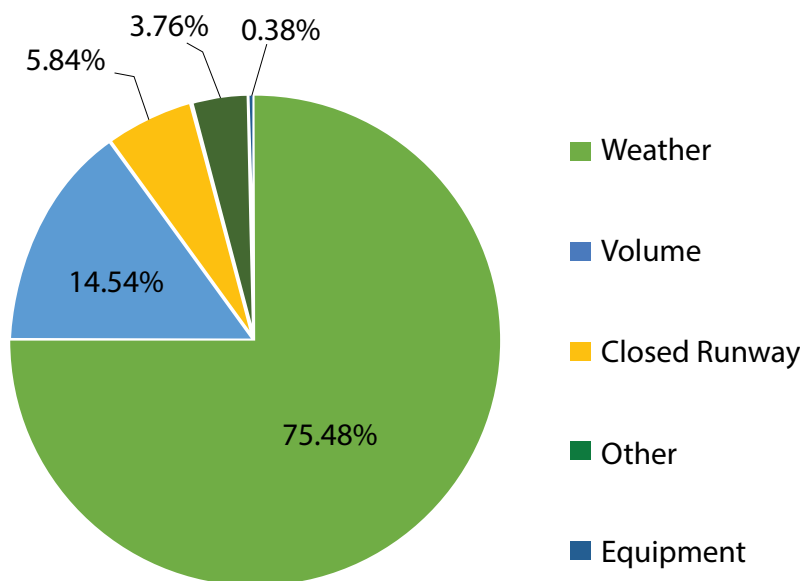
Delays in flights can affect **crew rosters**. If the right complement of

trained crew is not available at the required locations, flights can get further delayed until the requisite crew becomes available. The crew scheduling challenge is further exacerbated by regulations that specify the number of flying hours per day and mandatory rest periods for crew, as well as regular pilot training and certification on each aircraft type.

The major causes of airline disruption (as recorded in the FAA's Operations Network) leading to delays of more than 15 minutes during June 2017 to May 2022 are shown in the chart below.



What caused flight disruptions of more than 15 minutes (June 2017-May 2022)



Source: <https://www.faa.gov/nextgen/programs/weather/faq>

It is important to note that “weather” disrupts flight operations in many ways. For example, flights may not be able to land or take-off due to poor visibility or other weather conditions. Runways and tarmacs may be snowed in or waterlogged, requiring additional time to clear. Prolonged power failures caused by bad weather can impact ground operations. The rostered crew may not be able to reach airports in time or delays beyond limit cause the crew in duty off the roster due to duty hour limits.

Of late, however, airlines are having to deal with disruptions caused by factors that were not previously seen as major risks. These factors amplify the magnitude of disruption and the time needed for airports and airlines to recover.

Global warming and other various environmental changes cause **Unpredictable, unseasonal weather patterns** across the world no longer not just delay take-offs and landings but are also causing instances of severe mid-air turbulence that have led to serious injury and even death of passengers. The regulatory reporting and compliance procedures associated with damage to aircraft or injury to passengers increases turnaround time of aircraft and crew, in turn impacting deployment on the next route. The **non-availability of spare parts and technical teams** at every location adds to the time needed to make the aircraft flightworthy again.

Many airports and airlines recently experienced a new kind of disruption other than typical Passenger Service Systems (PSS) outage, when a **faulty software update by CrowdStrike** impacted systems that ran Microsoft software. The glitch reportedly affected millions of computer systems across the world, including many that airlines rely on for their operations. Each airline relies on multiple software systems to support business critical functions. An issue with any one of the systems can potentially bring

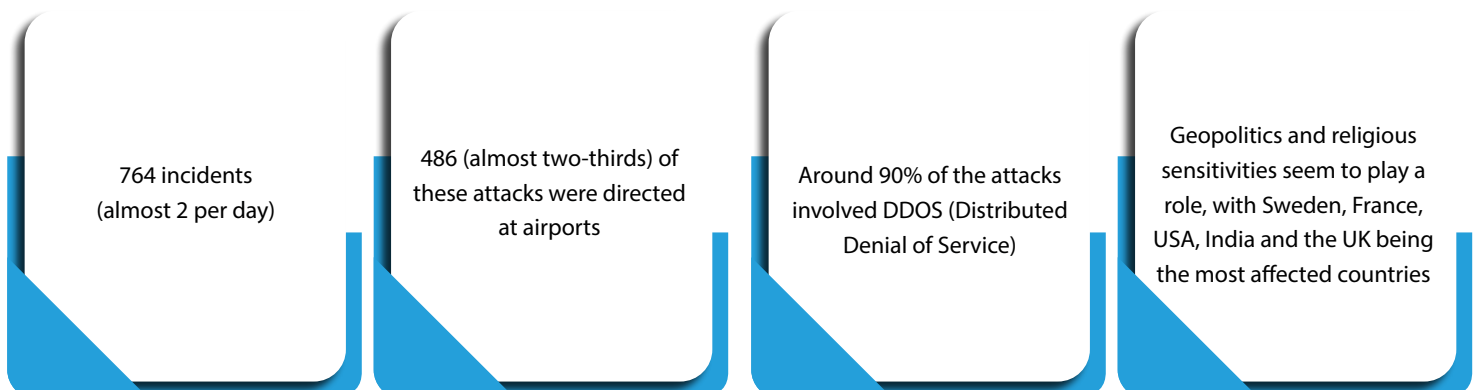
operations to a standstill. Although the CrowdStrike episode is believed to have mainly affected airline reservation and scheduling systems, media reports indicate that the “blue screen of death” (“BSOD”) did also impact check-ins and boarding for several airlines. This disruption caused a backlog of flights at many airports around the world, with some airlines taking many days to get back to their normal schedules. The risk of such glitches recurring in the future cannot be entirely ruled out.

Another potential source of major disruption is breach of cybersecurity defenses. The number of **cyberattacks** on enterprises including airlines has seen a steady rise. Between 2019 and 2020, there was a 530% increase in the number of cyberattack attempts reported to Eurocontrol. In 2020, 775 cyberattacks on airlines were reported, besides 150 at airports. Around 95% of these attacks were motivated by financial gains. A financial loss was reported in 55% of the cases, while data leaks occurred in almost 35% of the breaches.

(source: <https://www.linkedin.com/pulse/cyber-security-civil-aviation-critical-concern-hossam-elmoshrify-vonke>).

Like for other business enterprises, cybersecurity is a top priority for airlines as well. Yet, the complex nature of the industry makes members of the ecosystem vulnerable to cyberattacks that can be engineered through vectors that target the airlines’ own systems, those of agents, airports, partners, or third-party vendors. Attacks could include ransomware or attempts to steal data (names, addresses, emails, credit card details etc. that can be used for perpetrating further scams and frauds). Sometimes, such attacks are aimed at disrupting operations, instilling fear among the public and causing political and economic chaos.

Data on cyberattacks on the aviation industry in 2023 reveals the following:



Source: <https://sysdream.com/blog/dive-into-thre-cyber-threat-landscape-in-the-aviation-industry-2023/>

What can airlines do to reduce the risk of disruptions and manage them better?

Airlines cannot eliminate disruptions altogether, but they can plan for such contingencies and execute their “Irregular Operations” (“IROPS”) more efficiently to minimize the adverse impact on customer experience and business. IROPS are a well-defined set of procedures that span diverse operational areas such as reservations, crew scheduling & management, aircraft maintenance & availability, flight operations etc.

We believe that re-engineered policies and processes, modernizing existing systems and taking advantage of advances in multiple technologies (e.g., IOT, GenAI, analytics, cloud etc.) can help

airlines better mitigate the impact of various disruptions. The right organizational mindset, combined with the right actions can help airlines to at least partially offset the gains painstakingly achieved to sustain superior customer experience through innovations and operational excellence in other areas. Naturally, the actions must be aligned to the airline’s business model, growth strategies, and technology landscape.

Here are some suggestions around what airlines can do to individually and their ecosystems collectively to manage disruptions with greater efficacy.

Innovative use of technology

Consistent IROPS Communication to the passengers as well as the staff are key in the case of disruptions. The typical scenarios of disparate systems producing the delay/cancellation/rebooking/ etc., notifications are usually out of sync as some messages may be coming from the PSS system, some could be from the flight ops, some could be from the CRM system, some could be from the current disruption communication systems. It would be better to consolidate the communications using automated tools and then create a single channel of communication adaptive to the passengers’ elite status, type of travel, language, assistance needs.

Use **predictive technologies** to anticipate maintenance needs and proactively schedule preventive maintenance to reduce the risk of mechanical failures. This also gives the maintenance teams access to the craft when it is at an MRO location as also enough time to procure critical components.

Cross-platform communication with crew and customers/ passengers is a critical capability especially during disruptions. Often, decisions need to be made quickly. Rather than use communication channels sequentially, airlines should use platforms that support multiple channels because what is important is to engage with crew and passengers quickly and make them part of the solution process.

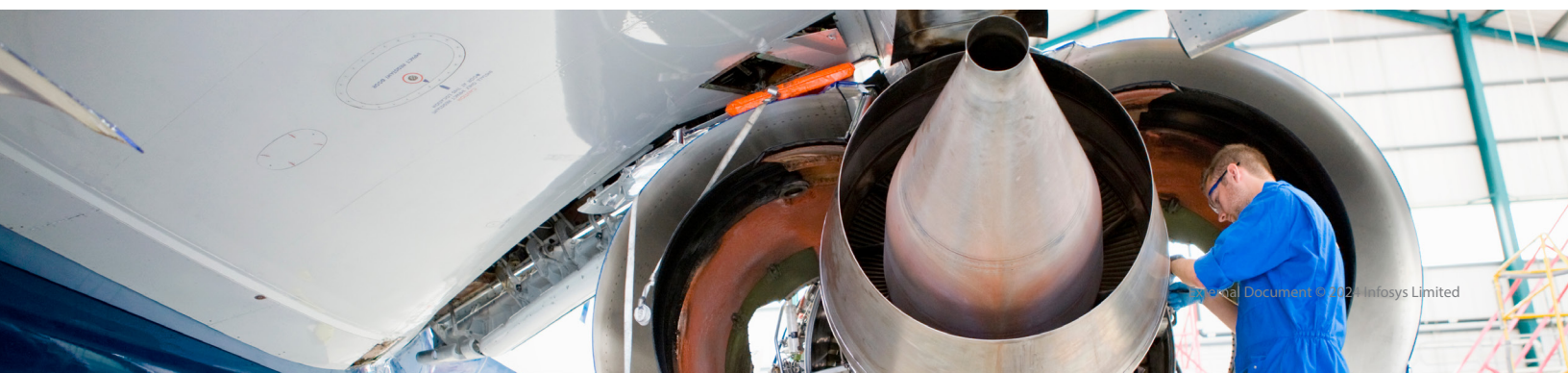
Integrated IROPS view – *During disruptions (IROPS) airlines primary objective is to bring the schedule back to normal as fast as possible with less worst day of disruptions.* Major challenge is in the Crew/ fleet scheduling is a complex task that needs optimization of multiple variables. AI-powered algorithms can process a lot more data than conventional models and thus provide more efficient solutions in scenarios that are inherently dynamic. For example, during IROPS scenarios, an “Integrated” view of crew, fleet,

passengers, revenue as one optimization challenge involving variables like cost, travel time for replacement crews, impact on the next route the aircraft is scheduled to fly on, passenger volume across routes, revenue, upcoming scheduled maintenance etc.

Modernize CRM platforms so that customer/passenger communications are speeded up. There is no point sending information that is outdated because by the time it reaches customers it is 1.5 or 2 hours old.

Hyper-personalization by integrating AI with CRM to juxtapose data such as age, health, reason for travel and past experiences of delays etc. for passengers on flights impacted by disruption and offer solutions that better mitigate the frustration and pain. For example, someone traveling to meet a sick relative, funeral of a family member or as keynote speaker for a conference probably ought to be given higher priority when finding alternative flights than someone who risks losing a day from their vacation. [I am not suggesting that vacations are not important; in the examples I have cited, I am sure you will agree that the other passengers must be considered first].

Rather than wait for a disruption to hit and then get employees in a tizzy, airlines can explore the possibility of developing a **rules-driven disruption management system** that triggers a series of actions such as prioritizing rerouting of affected passengers, communicating with them in a language of their choice, informing passengers scheduled to take the flight from downstream destinations etc. Depending on what caused the disruption, the system can also schedule replacement of aircraft, crews, checking for landing slots and parking charges etc.



Changes to processes

During disruptions, airlines must **make it easy for passengers to find relevant information** in DIY mode using smarter communication channels (including AI-powered apps and integrated language translator bots). This will not only reduce anxiety and dissatisfaction levels amongst passengers but also eases the pressure on airline staff on the ground who deal with irate passengers.

Explore the possibility of a **higher level of real-time collaboration with other airlines for seat-sharing**. This is a practice that can be adopted even during situations of extra-low flight occupancy. Of course, airlines must find ways to honor loyalty and frequent flyer programs.

The kind of collaboration we envision can extend to ecosystems that go beyond conventional network alliances. Where airlines use similar aircraft, they can explore the possibility of **creating shared MRO hubs** where possible. This can lower fixed costs and overheads for all partner airlines, while also reducing the time needed to service aircraft and make them fit for purpose quickly.

The lack of contact details is often a critical gap because many customers book tickets on behalf of someone else or through third-party apps or through agents. Airline CRM databases are thus not updated often enough. Airlines must **mandatorily update and validate contact details** of customers/travelers by making it easy for them to do so during booking. This will make it easy to inform travelers and designated contacts of potential delays as soon as airlines receive such information.

When airlines receive advance information about potentially challenging weather forecasts on certain routes, they can consider **pre-emptively looking at options and start**

contacting passengers to warn them of the likely disruption and simultaneously ask for rescheduling preferences on alternative flights?

The best resolution to each disruption will vary, and can involve flight cancellation, replacing aircraft, operating the flight with a replacement crew or rebooking every affected passenger on alternative flights or some combination of these possibilities. Each combination will have different impact on cost, time, passenger satisfaction, regulatory compliance etc. Other operational and regulatory constraints too must be taken into consideration when arriving at the best solution to every disruption.

Multiple teams are involved in identifying and implementing the resolution. Timely and coordinated information sharing amongst stakeholders is critical to identify and analyze the tradeoffs associated with different solution possibilities and make the necessary decisions. Since relevant data reside across legacy/modern/own/third-party systems, real-time interoperability is a roadblock that impedes actions to manage disruptions. Airlines must explore the possibility of **creating integrated dashboards and harnessing the power of AI-enabled algorithmic planning to generate and prioritize resolutions** that optimize the desired mix of resources. For example, algorithmic planning can help airlines analyze vast amounts of data around air traffic at airports, en route and destination weather conditions, loads, aircraft condition, cruising altitudes, fuel consumption etc. to recommend best routes in terms of saving time, reducing fuel consumption etc. Algorithmic planning techniques can also be used in coming up with solutions to book impacted passengers, identify replacement crews, aircraft etc.





Final thoughts

We at Infosys believe that finding ways to manage disruptions effectively can be a source of competitive edge for airlines. Predicting 100% of disruptions is impossible; however, IROPs can be made more efficient and effective through better use of cutting-edge technologies as well as changes to some policies, processes and modernization of legacy systems.

For more information on how you can benefit from Infosys' extensive experience in the airline/aviation sector, or to know more about Infosys' Cobalt airline cloud offering can help your business, email us on TravelPractice@infosys.com.

About the Authors

Hitesh Kesaria

Manager, Client Services, Travel Practice, Infosys

Ruchika Bansal

Manager, Client Services, Travel Practice, Infosys

For more information, contact askus@infosys.com



© 2024 Infosys Limited, Bengaluru, India. All Rights Reserved. Infosys believes the information in this document is accurate as of its publication date; such information is subject to change without notice. Infosys acknowledges the proprietary rights of other companies to the trademarks, product names and such other intellectual property rights mentioned in this document. Except as expressly permitted, neither this documentation nor any part of it may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, printing, photocopying, recording or otherwise, without the prior permission of Infosys Limited and/ or any named intellectual property rights holders under this document.